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jc796 U.S. PTO

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jc564 U.S. PTO
09/550677
04/17/00

Docket No.: 6260-A-1

Date: April 17, 2000

Asst. Commissioner for Patents
BOX PATENT APPLICATION
Washington, D.C. 20231

Dear Sir:

Express Mail Label No. EL 148 765 399 US
Date of Deposit April 17, 2000 I hereby certify
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BOX PATENT APPLICATION

Kathleen V. Novak
Kathleen V. Novak

Transmitted herewith for filing is the patent application of:

INVENTOR: BURKHART, CHRISTOPHER L.

ENTITLED: **DISENGAGEABLE NOCK FOR ARROWS**

Enclosed are:

X One photocopy of 7 sheets of drawings (Figs. 1-7), with identification label on each reverse side.

 An Assignment of the invention to (see paragraph below for payment of recordation fee).

X An executed Declaration and Power of Attorney is enclosed.

X An executed Verified Statement Claiming Small Entity Status (Independent Inventor) is enclosed.

 A certified copy of .

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CLAIMS AS FILED

| | | | Present Extra | | Rate | | Additional Fee |
|-------------|-----------|---|------------------|---|------------|-----------|-------------------|
| Total | | | | | | | |
| Claims | <u>21</u> | - | <u>20</u> | = | <u>1</u> x | \$ 9.00 = | \$ <u>9.00</u> |
| Independent | | | | | | | |
| Claims | <u>3</u> | - | <u>3</u> | = | <u>0</u> x | \$39.00 = | \$ <u> </u> |

Basic Fee: \$ 345.00

Total Additional Fee: 9.00

Total Filing Fee: \$354.00

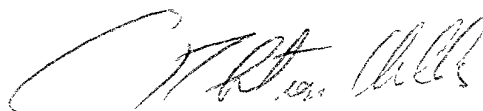
X The Commissioner is hereby authorized to charge any additional fees which may be required by this paper to Deposit Account No. 03-0088 and to credit any overpayment to this Deposit Account. This document is submitted in **TRIPLICATE**.

X A check is enclosed in the amount of \$ 354.00 to cover the filing fee for a small entity.

 An Information Disclosure Statement and attached PTO Form 1449, accompanied by copies of the references listed, are enclosed.

Respectfully submitted,

CAHILL, SUTTON & THOMAS P.L.C.



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VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(f) AND 1.27(b)) - INDEPENDENT INVENTOR

Applicant: CHRISTOPHER L. BURKHART
Serial No:
Filed: Herewith
For: "DISENGAGEABLE NOCK FOR ARROWS"

As the below named inventor, I hereby declare that I qualify as independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention identified above and described in the specification filed herewith.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant or convey, or license any rights in the invention is listed below:

NAME OF SMALL BUSINESS CONCERN: NONE

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

DATE Apr. 14, 2000 NAME OF INVENTOR: CHRISTOPHER L. BURKHART

SIGNATURE OF INVENTOR: 

DISENGAGEABLE NOCK FOR ARROWS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to archery equipment and, more particularly, to nocks for use with arrows.

2. Description of Related Art

In the field of modern archery, the rear end of an arrow includes a notch for receiving the bowstring. Usually, the notch is defined by a permanently attached nock. The nock includes a hollow end for receiving the end of the arrow shaft. If the shaft is tubular, the nock may include a stud for insertion into the shaft. Other variants for attaching the nock to the shaft exist.

The notch of the nock is formed by a pair of rearwardly extending wings for receiving the bowstring therebetween. These wings usually include opposed inwardly extending protrusions for gripping the bowstring as the bowstring is drawn back and released, whether by one's fingers or by a mechanical triggering element. Generally, the bowstring includes a nocking point formed by dental floss, light thread, or yarn wrapped around the bowstring. Various commercially available sleeves may be attached about the bowstring to serve as a nocking point.

Since the bowstring is drawn back by engaging the bowstring itself, not the arrow, there is some danger of the arrow shaft disengaging from the bowstring unless the nock firmly grips the bowstring. Such gripping is provided by the protrusions discussed above. Upon release of the bowstring, the arrow accelerates rapidly in the direction of flight. The resulting momentum of the arrow causes the nock to release from the bowstring at the end of forward travel of the bowstring. The resulting resistance to forward movement of the arrow caused by the arrow overcoming the clamping action of the nock to effect release of the arrow decelerates the arrow to an extent which is a function of the gripping force exerted by the nock. Such deceleration negatively affects the speed of the arrow and hence distance traveled. Moreover, the sudden deceleration may set up a quiver or vibration of the arrow shaft along its length which affects its aerodynamic properties, and increases air resistance. The vibrating arrow shaft may also affect the accuracy of its expected trajectory. By reducing the clamping force of the nock, inadvertent disengagement of the nock from the bowstring is to be expected under field conditions. Such disengagement is unacceptable in a hunting environment. This result may even cause a life-threatening situation if the animal being hunted is prone to attack the archer.

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SUMMARY OF THE INVENTION

The present invention is a two-part nock having an insert permanently attached to the rear end of the shaft of an arrow and a receiver retained by a bowstring and disengageably engageable with the insert. The receiver includes a notch for receiving the bowstring and a pin extending
5 across the notch for precluding disengagement of the bowstring from the notch. A cavity in the receiver slidably receives the insert in a predetermined aligned manner to ensure proper orientation of the fletching or feathers of the arrow. The insert is retained with the receiver by use of a magnet, hook and loop fastening means, or other disengageable engaging means. The retention force between the insert and the receiver is sufficient to preclude disengagement of the
10 arrow as the bowstring is pulled back under field conditions and yet the force required to release the arrow at the end of travel of the bowstring is minimal and has little negative effect upon the flight path of the arrow.

It is therefore a primary object of the present invention to provide a two-part nock for easily disengaging an arrow from a bowstring.

15 Another object of the present invention is to provide a two-part nock having a receiver retained on a bowstring and a shaft mounted insert disengageably engageable with the receiver.

Still another object of the present invention is to provide a two-part nock using a magnetic force to retain the parts engaged and yet permit disengagement.

Yet another object of the present invention is to provide a nock attached to a bowstring for disengageably engaging the end of the shaft of an arrow in predetermined alignment.

A further object of the present invention is to provide a nock attached to a bowstring at a predetermined location for engaging the end of an arrow shaft in predetermined alignment.

A still further object of the present invention is to provide a nock having an insert permanently attached to the end of an arrow shaft for disengageable engagement with a receiver secured to a bowstring.

A yet further object of the present invention is to provide a method for releasably securing an arrow shaft with a nock attached to a bowstring.

These and other objects of the present invention will become apparent to those skilled in the art as the description thereof proceeds.

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BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be described with greater specificity and clarity with reference to the following drawings, in which:

Figure 1 illustrates an assembled two-part nock;

Figure 2 illustrates the insert and receiver of a two-part nock;

Figure 3 illustrates a partial view of the bowstring retention element of the receiver;

Figure 4 illustrates a magnet for disengageably engaging the insert with the receiver;

Figure 5 is an end view from the front of the nock taken along lines 5-5, as shown in

Figure 1;

Figure 6 is an end view from the rear of the nock taken along lines 6-6, as shown in

Figure 1; and

Figure 7 illustrates a further variant construction of the insert to engage a further type of arrow shaft.

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DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring jointly to Figures 1 and 2, there is shown a two-partnock 10 having an insert 12 and a receiver 14. Reduced diameter stud 16 of insert 12 fits within and is secured to the rear end of hollow shaft 18 of an arrow 20. The attachment between the stud and the shaft may be secured by use of an adhesive, press fit, or the like, for a permanent engagement. A base 22 of insert 12 slidably fits within a sleeve 24 of receiver 12. A notch 26 is formed in receiver 14 by a pair of wings 28,30. A bowstring 32 is seated within notch 26 and is prevented from disengagement with receiver 14 of nock 10 by a pin 34 secured in wings 28,30 and extending across the notch. Axial orientation of arrow 20 relative to the bow and bowstring is important to ensure that the fletchings, or feathers, of the arrow are correctly oriented with respect to the bow and with respect to any attachments to the bow in proximity of the arrow as the arrow is discharged therepast. Such orientation is achieved by ridge 36 extending radially from insert 12 into engagement with a slot 38 formed in sleeve 24 of receiver 14.

Referring jointly to Figures 2, 3, and 4, further details of nock 10 will be described. Sleeve 24 of receiver 14 includes a cylindrical cavity 40 for receiving base 22 of insert 12. The end of the base includes an iron, steel, or other magnetically responsive plate 42. As shown in the partial cutaway view in Figure 4 of sleeve 24, a magnet 44 is disposed at the end of cylindrical cavity 40 in receiver 14. Upon insertion of base 22 into the cylindrical cavity, the force of magnet 44 acting upon plate 42 will retain insert 12 in engagement with receiver 14. Upon exertion of an axially oriented force upon insert 12 away from receiver 14, such as the momentum of the arrow leaving the bowstring, the magnetic force between magnet 44 and plate

42 will be overcome and separation between the insert and the receiver of the nock will occur. It is to be understood that the locations of the magnet and plate may be reversed and that other disengageable/engageable means such as a pair of magnets to increase the magnetic force, the hook and loop type fastener sold under the trademark Velcro™, a reusable mastic, ball and releaseable socket, or other chemical or mechanical elements permitting engagement and disengagement upon application of appropriate forces, are also useable.

To assist bringing about engagement of the insert with the receiver to secure an arrow to the bowstring, entrance to slot 38 may be chamfered by chamfers 50,52 to guide ridge 36 into the slot. Similarly, proximal end 54 of ridge 36 may be tapered or rounded (as shown) to facilitate insertion of the ridge into slot 38.

Retaining pin 34 discussed with respect to Figure 1 is shown in further detail in Figure 3. While pin 34 may be removable to permit insertion of bowstring 32 into notch 26, such removal should be only on an occasional basis. Receiver 14 is intended to remain affixed to the bowstring during a hunting or other archery related event. It is therefore contemplated that the pin may be a press fit into corresponding aperture 56 of wing 28 and aperture 58 of wing 30. By using a press fit, the pin is removable when necessary and yet will be retained in place during normal use of the bow. Other retention means, such as a threaded engagement, can be used.

Referring particularly to Figure 4, there is shown a variant configuration of insert 12. In this variant, a cylindrical cavity 60 for receiving a necked down section of an arrow shaft is used instead of stud 16. Alternatively, if ridge 62, defining the cavity, will not interfere with the bow

or arrow support/guidance devices on the bow, the end of the shaft, without a necked down section, may be directly lodged within cylindrical cavity 60. Thus, the variant of insert 12 shown in Figure 4 is primarily for use with solid, not tubular, arrow shafts.

Referring jointly to Figures 5 and 6, the respective end views of nock 10 will be described. As shown in Figure 5, stud 16 is of a diameter reduced from that of insert 12 to accommodate for the wall thickness of an hollow arrow shaft disposed thereabout. Thereby, an essentially smooth cylindrical surface is presented at the junction of the arrow shaft and the insert to preclude interfering contact with the bow or elements thereof as the arrow assumes its flight path. Ridge 36, extending radially from the insert, is oriented with respect to the fletchings on the arrow shaft and the bow and its attachments to preclude interference therebetween as the arrow begins its travel past the bow. To prevent any possible interference between ridge 36 and the bow with its attachments, it is to be understood that a ridge may extend radially inwardly from sleeve 24 of receiver 14 for mating with a commensurately formed groove or slot in insert 12.

Receiver 14, as shown in Figure 6, may include a tapered section 70 to reduce the diameter present at wings 28,30. The inside surfaces of wings 38,30 may include opposed inwardly extending protrusions 72,74 for engaging and being retained at the nocking point on the bowstring. With or without these protrusions the proximal ends of the wings may be outwardly tapered or curved proximally of the protrusions,, as depicted by sections 76,78. Forwardly thereof, notch 26 may increase in width and thereafter close in a curved manner. Pin 34 may be flush with the outer surface of the wings or it may protrude slightly from each wing, as

illustrated. If one end of the pin protrudes a sufficient length, it may be gripped to remove the pin for insertion of the bowstring into the notch. If the ends of the pin are flush, the pin may be pushed toward one wing and thereafter withdrawn. Insertion of the pin into the wings after the bowstring has been placed in the notch is self-evident.

5 Figure 7 discloses a variant of insert 12 having a distal end 80 particularly suited for engaging and supporting an hollow arrow shaft. The distal end includes an external cylinder 82 and a stud 84 disposed therewithin to define an annular space 86 equivalent in width to the wall thickness of the arrow shaft. With the construction shown in Figure 7, a very robust attachment mechanism between the arrow shaft and the insert is achieved. The fit therebetween may be a
10 press fit, an adhesive may be used or other techniques may be used to secure insert 12 to the arrow shaft.

 While the invention has been described with reference to several particular embodiments thereof, those skilled in the art will be able to make the various modifications to the described embodiments of the invention without departing from the true spirit and scope of the invention.

15 It is intended that all combinations of elements and steps which perform substantially the same function in substantially the same way to achieve the same result are within the scope of the invention.

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I CLAIM:

- 1 1. Archery equipment comprising in combination:
 - 2 (a) a bow having a bowstring;
 - 3 (b) an arrow having a shaft, said shaft including a rear end;
 - 4 (c) a nock for disengageably engaging said rear end with said bowstring; and
 - 5 (d) said nock including an insert attached to said rear end, a receiver for engaging
6 said bowstring and disconnect means for disengageably engaging said insert with said receiver.
- 1 2. The archery equipment as set forth in Claim 1 wherein said disconnect means
2 includes magnetic means.
- 1 3. The archery equipment as set forth in Claim 2 wherein said magnetic means
2 includes a magnet secured to one of said insert and said receiver and a magnetically responsive
3 member secured to the other of said insert and said receiver.

1 4. The archery equipment as set forth in Claim 3 wherein said receiver includes a
2 cavity for receiving said insert and wherein said magnet and said magnetically responsive
3 member are disposed within said cavity during engagement of said insert with said receiver.

1 5. The archery equipment as set forth in Claim 1 wherein said receiver includes a
2 notch for receiving said bowstring and retention means for retaining said bowstring within said
3 notch during discharge of said arrow to prevent disengagement of said receiver from said
4 bowstring.

1 6. The archery equipment as set forth in Claim 5 wherein said retention means
2 comprises a pin extending across said notch.

1 7. The archery equipment as set forth in Claim 1 wherein said shaft is tubular and
2 wherein said insert includes a stud for penetrable engagement with said rear end.

1 8. The archery equipment as set forth in Claim 1 wherein said shaft is solid and
2 wherein said insert includes a cavity for receiving said rear end.

1 9. A nock for engaging the rear end of an arrow with a bowstring of a bow, said
2 nock comprising in combination:

3 (a) an insert fixedly attached to the rear end of said arrow;

4 (b) a receiver for capturing the bowstring and maintaining the bowstring captured
5 during discharge of the arrow from the bow; and

6 (c) disconnect means for disengageably engaging said insert with said receiver.

1 10. The nock as set forth in Claim 9 wherein said receiver includes a notch for
2 penetrable engagement by the bowstring and means for retaining the bowstring within said notch
3 during discharge of the arrow from the bow.

1 11. The nock as set forth in Claim 9 wherein said disconnect means includes magnetic
2 means for disengageably engaging said insert with said receiver.

1 12. The nock as set forth in Claim 9 wherein said receiver includes a cavity for
2 receiving a part of said insert and for locating said disconnect means therein during engagement
3 of said insert with said receiver.

1 13. The nock as set forth in Claim 12 wherein said disconnect means includes a
2 magnet attached to said receiver within said cavity and a plate attached to an end of said insert
3 locatable within said cavity.

1 14. The nock as set forth in Claim 9 wherein the arrow includes a tubular shaft and
2 wherein said insert includes a stud for penetrable engagement with the rear end of the tubular
3 shaft.

1 15. The nock as set forth in Claim 14 wherein said disconnect means includes
2 magnetic means for disengageably engaging said insert with said receiver.

1 16. The nock as set forth in Claim 9 wherein the arrow includes a solid shaft and
2 wherein said insert includes a cavity for receiving the rear end of the tubular shaft.

1 17. The nock as set forth in Claim 16 wherein said disconnect means includes
2 magnetic means for disengageably engaging said insert with said receiver.

1 18. A method for disengageably engaging an arrow with the bowstring of a bow and
2 for discharging the arrow from the bow upon release of the drawn bowstring, said method
3 comprising in combination:

4 (a) attaching an insert to the rear end of the shaft of the arrow;

5 (b) capturing the bowstring with a receiver to maintain the receiver in engagement
6 with the bowstring during discharge of the arrow;

7 (c) disengageably engaging the insert with the receiver to maintain the arrow
8 attached to the bowstring as the bowstring is drawn back and upon release of the bowstring; and

9 (d) disengaging the insert from the receiver as a function of the momentum of the
10 arrow when the bowstring comes to its position of rest.

1 19. The method as set forth in Claim 18 wherein said step of disengageably engaging
2 includes the step of creating and maintaining magnetic attraction between the insert and the
3 receiver when the insert and receiver are engaged with one another.

1 20. The method as set forth in Claim 18 wherein said step of capturing includes the
2 step of retaining the bowstring within a notch in the receiver.

1 21. The method as set forth in Claim 20 wherein said step of disengageably engaging
2 includes the step of creating and maintaining magnetic attraction between the insert and the
3 receiver when the insert and receiver are engaged with one another.

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DISENGAGEABLE NOCK FOR ARROWS

ABSTRACT

A nock for use with an arrow includes a receiver having a bowstring engaging notch with a pin extending thereacross to capture and retain the bowstring within the notch and an insert permanently attached to an arrow shaft for disengageably engaging the receiver. A retention device, such as a magnet attached to the receiver, magnetically cooperating with a magnetically responsive member attached to the insert, retains the arrow shaft in engagement with the bowstring as the bowstring is pulled back. Upon release of the bowstring, the forward momentum of the arrow overcomes the retention force of the retention device and the arrow shaft disengages from the receiver to begin its flight.

FIG. 1 is a perspective view of the device in accordance with the present invention.

Insert and receiving sections
shown joined together

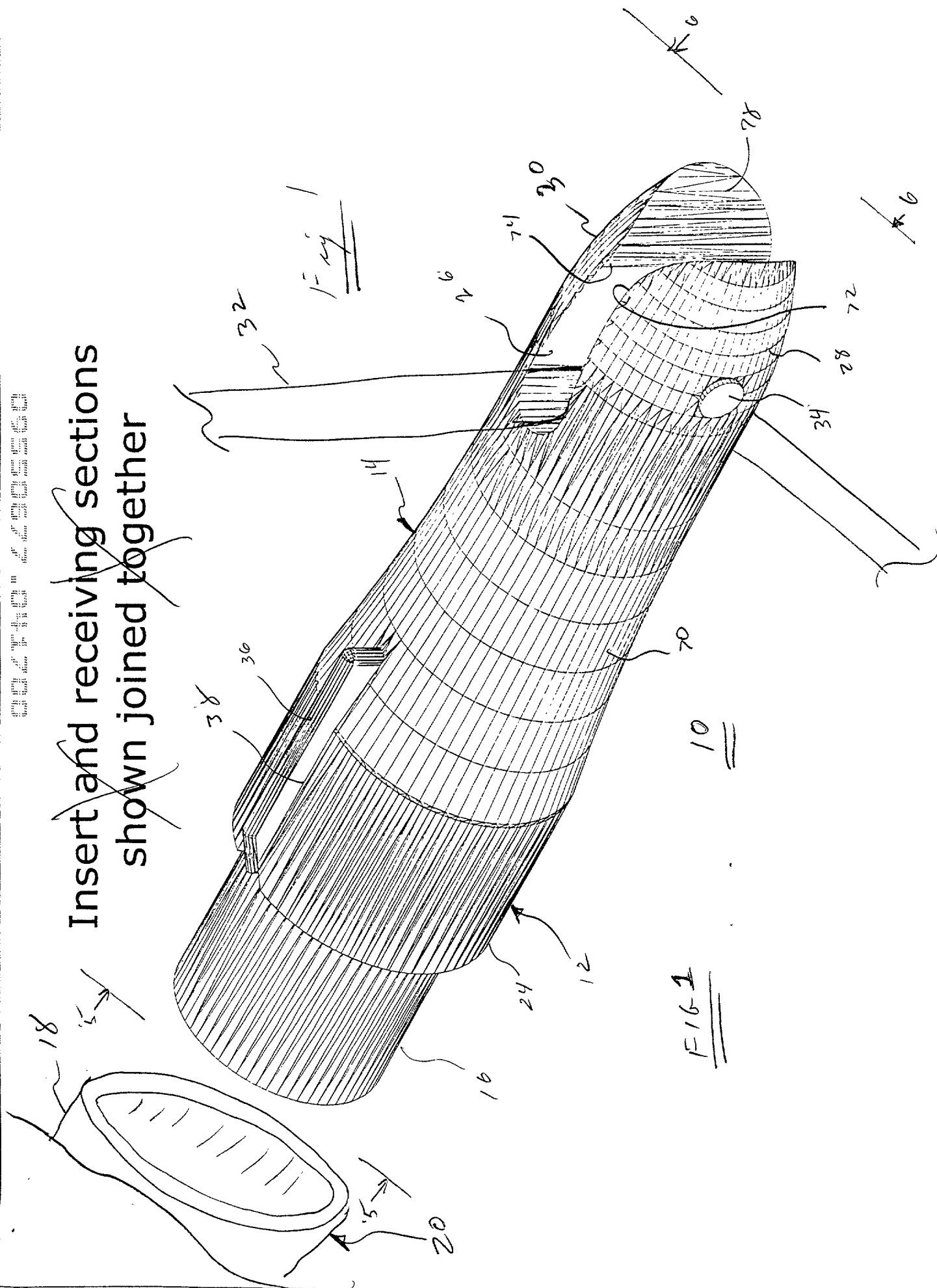
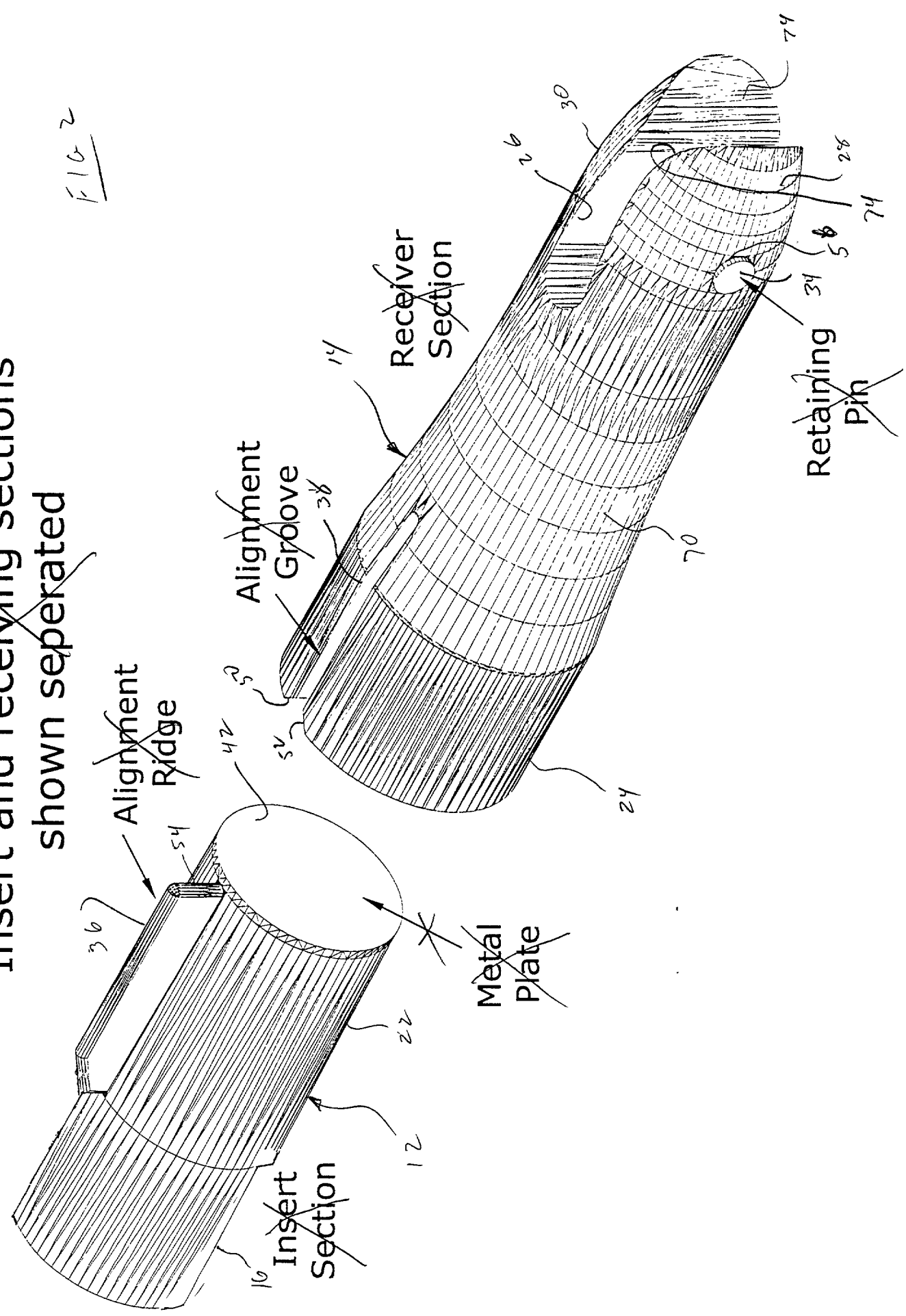


FIG. 1

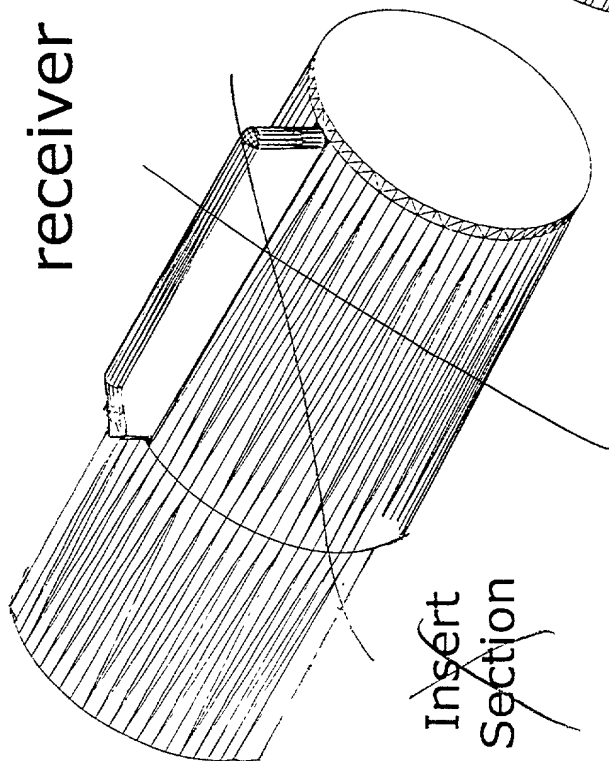
10

~~Insert and receiving sections shown seperated~~

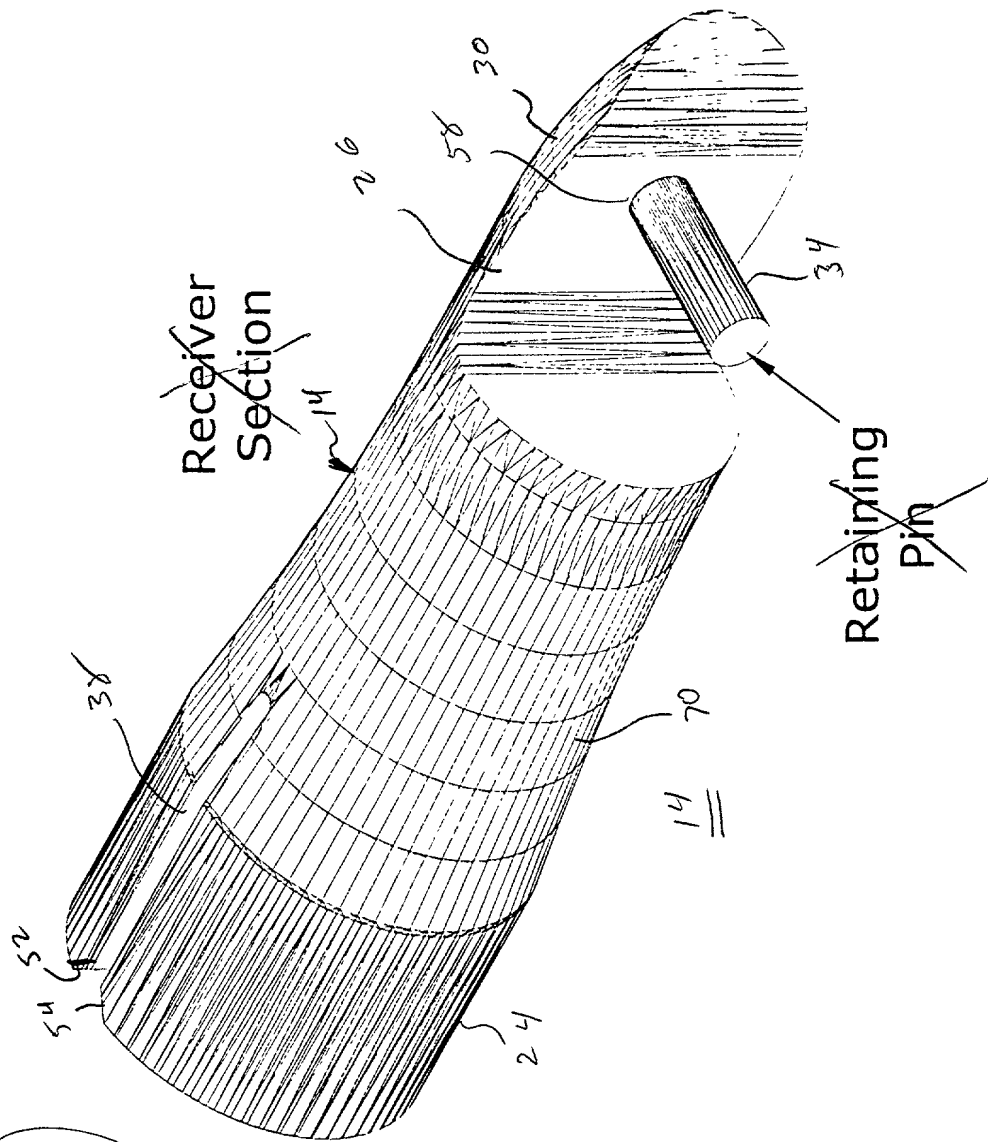
FIG. 2



Cutaway view showing receiver section retaining pin



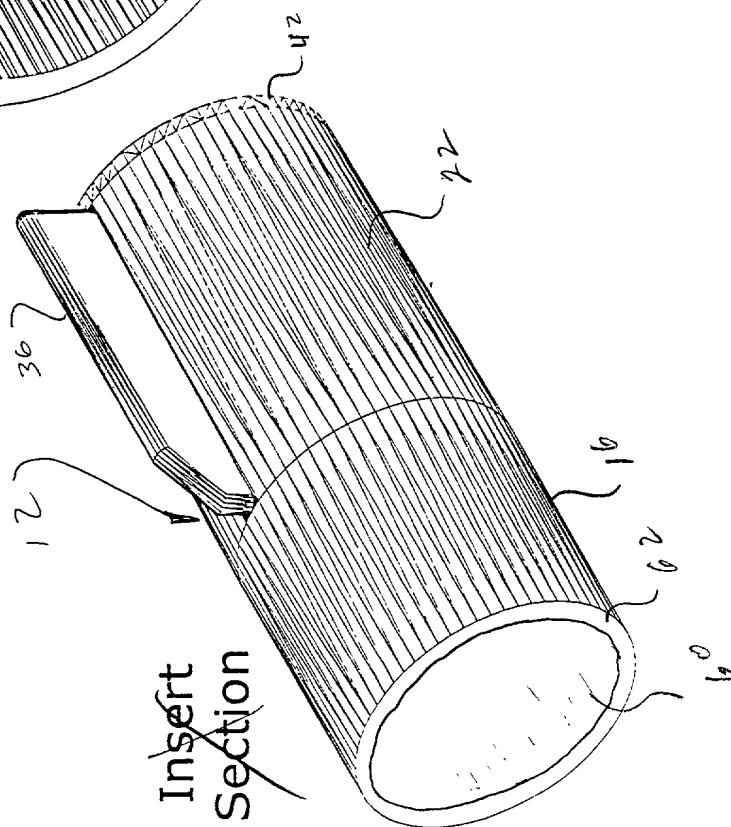
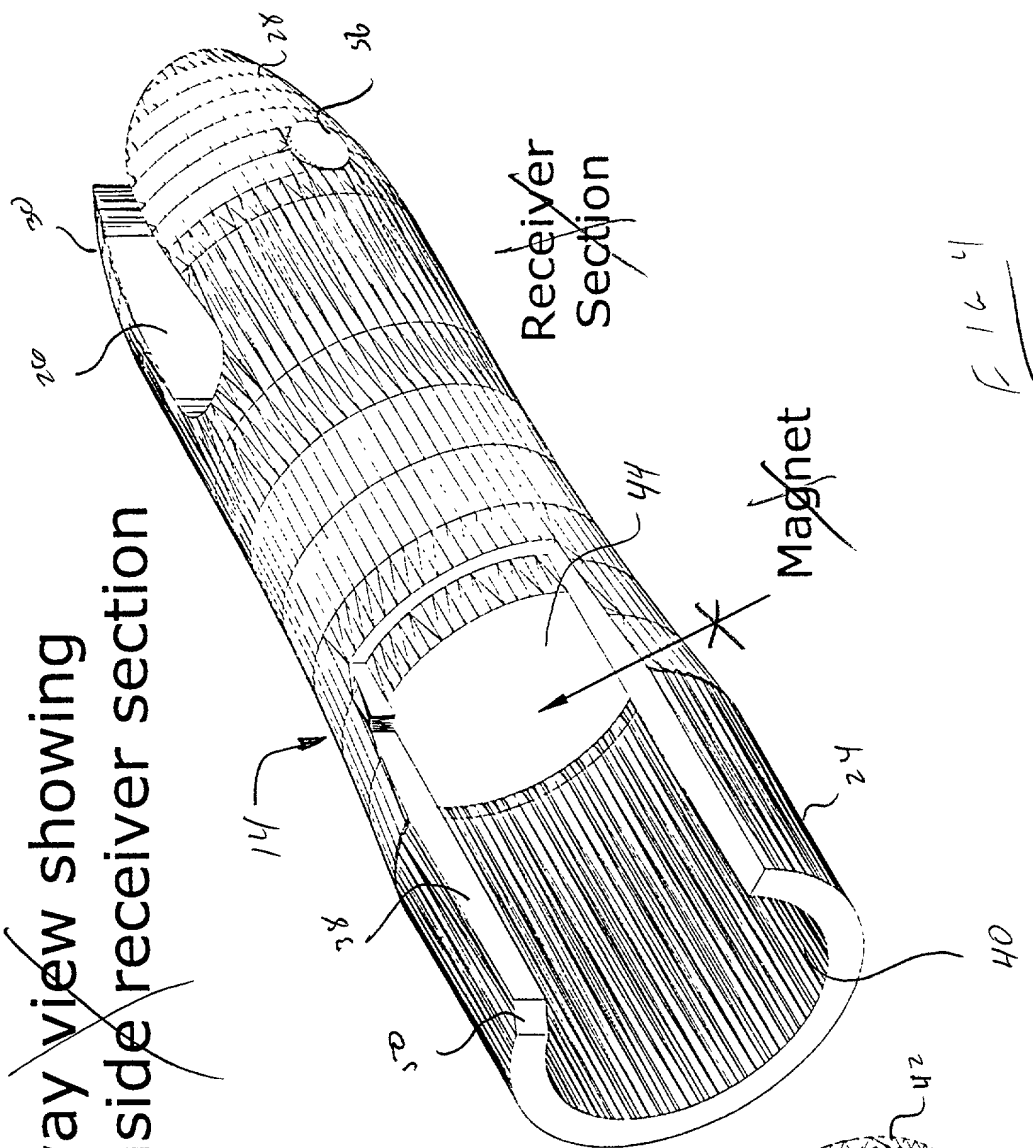
Insert
Section



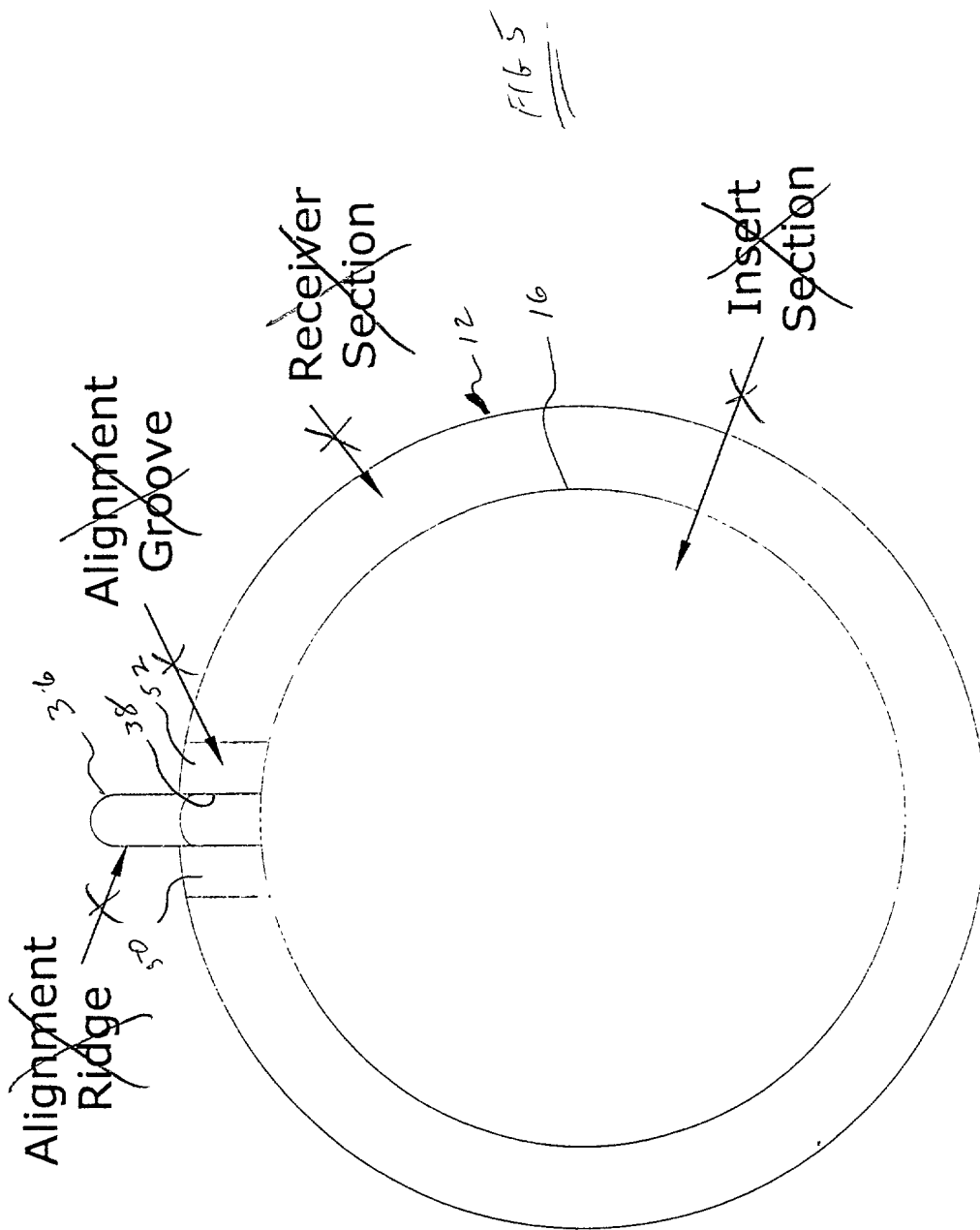
Receiver
Section

Retaining
Pin

~~Cutaway view showing magnet inside receiver section~~



~~End view from insert section~~



End view from receiver end

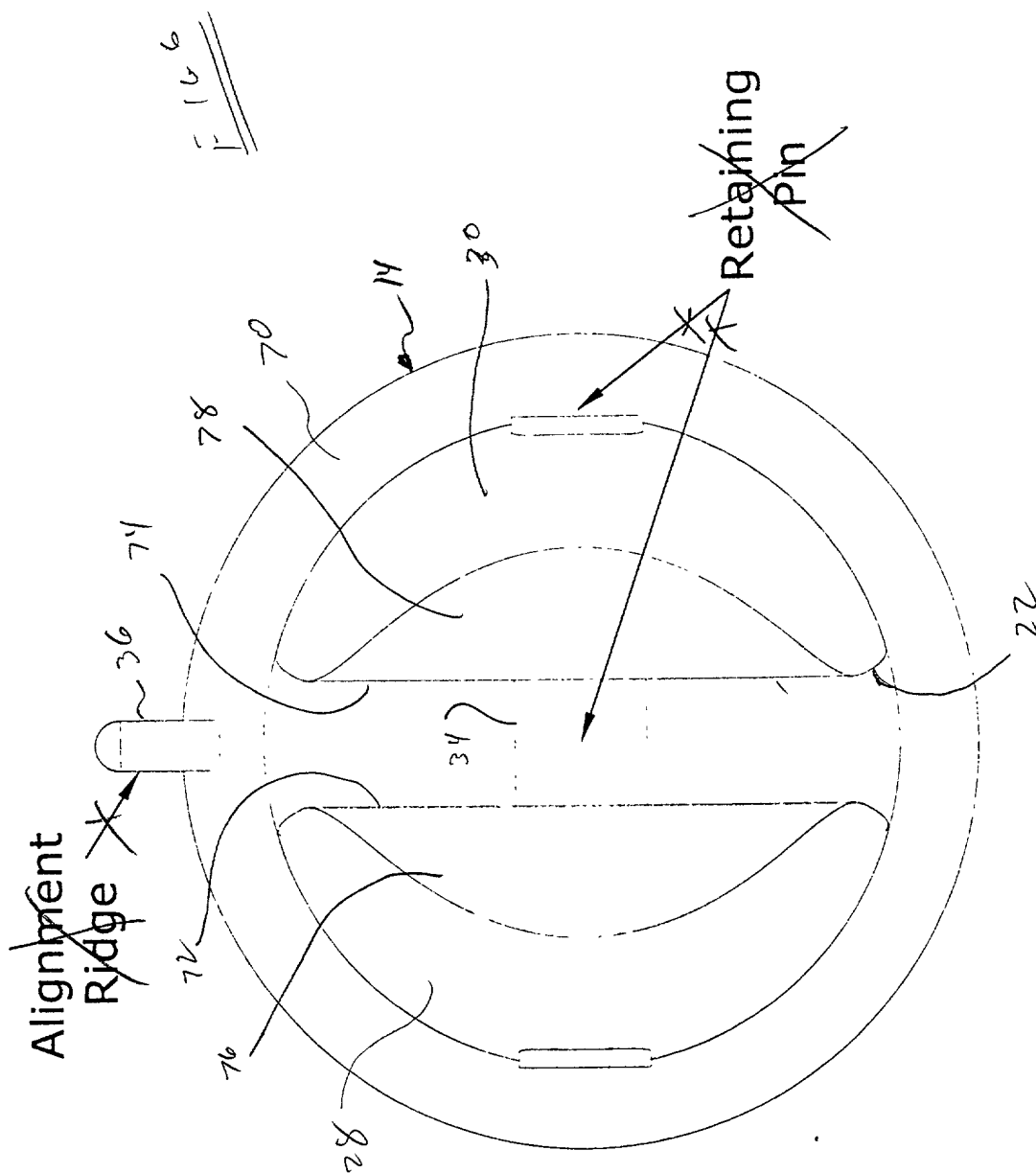
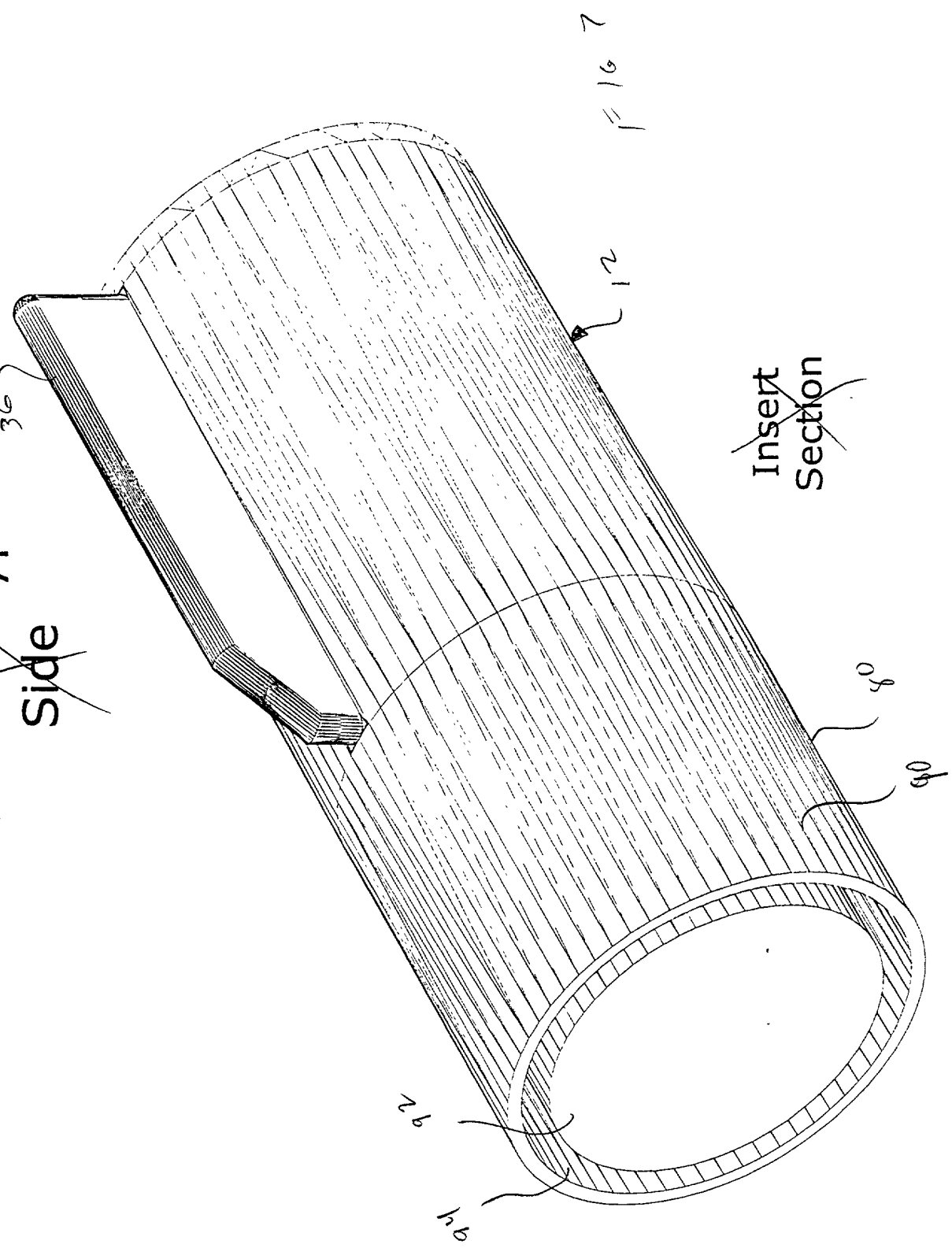


FIG. 2 is a perspective view of the shaft of the arrow shaft type 2, showing the shaft in a bent position, with the shaft being bent at the joint 36, and the shaft being bent at the joint 36, and the shaft being bent at the joint 36.

~~Arrow shaft type 2~~
~~Side~~



~~Insert~~
~~Section~~

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor of the subject matter which is claimed in an application entitled **"DISENGAGEABLE NOCK FOR ARROWS"**, the specification of which is attached hereto.

I hereby state that I have reviewed and understand the contents of the above-identified specification including the claims.

I hereby state further that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above pursuant to 37 CFR §1.67(a).

I acknowledge the duty to disclose to the Patent Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56, including such information which occurred between the filing date of the above-identified prior application and the present date.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Number: None

Country:

Day, Month and Year filed:

Priority Claimed: ☐ yes ☒ no

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

And I hereby appoint: C. Robert von Hellens, Reg. No. 25,714; William C. Cahill, Reg. No. 19,742; Charles R. Hoffman, Reg. No. 26,556; Marvin A. Glazer, Reg. No. 28,801; and

Thomas G. Watkins III, Reg. No. 27,964 as my attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

All telephone calls and correspondence on my behalf for this application should be directed to:

C. Robert von Hellens
CAHILL, SUTTON & THOMAS P.L.C.
155 Park One
2141 East Highland Avenue
Phoenix, Arizona 85016
Telephone (602) 956-7000

Wherefore I pray that Letters Patent be granted to me for the invention or discovery described and claimed in the above-identified patent application.

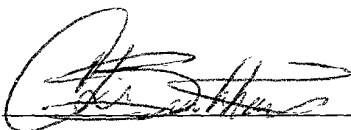
Full name of inventor: **CHRISTOPHER L. BURKHART**

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Post Office Address: Same

Citizenship: U.S.A.

Inventor's signature:



Date:

April 14, 2000